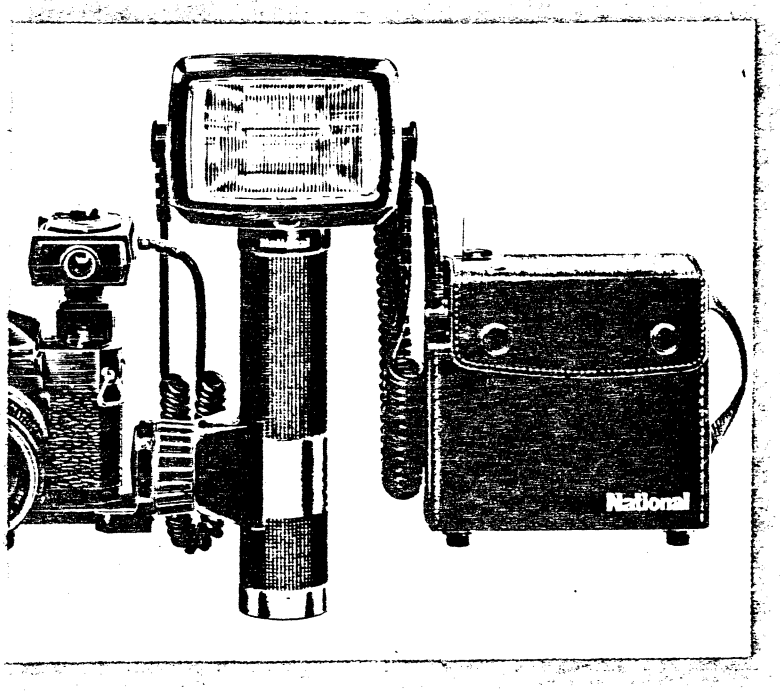
Original

# Service Manual

National
FLASH UNIT
National




## MODEL PE-5650

### SPECIFICATIONS

| | |
|---|---|
| Guide Number | 56 (wide 40) ASA 100 (DIN 21) colour / m<br>40 (wide 28) ASA 50 (DIN 18) colour / m<br>92 (wide 65) ASA 25 (DIN 15) colour / ft |
| Flash Duration | Automatic: 1 / 30,000 to 1 / 300 sec. approx.<br>Manual: 1 / 300 sec. approx. |
| Automatic Operation Range (approx.) | With ASA 100 (DIN 21) film<br>F4 1 to 14 meters (wide: 0.7 to 10 meters)<br>F5.6 1 to 10 meters (wide: 0.7 to 7.1 meters)<br>F8 1 to 7 meters (wide: 0.7 to 5 meters)<br>F11 1 to 5.1 meters (wide: 0.7 to 3.6 meters)<br>F16 1 to 3.5 meters (wide: 0.7 to 2.5 meters) |
| Aperture for Automatic Operation | Freely adjustable F-stop selector dial<br>(1) From F4 to F16, ASA 100 (DIN 21)<br>(2) From F2.8 to F11, ASA 50 (DIN 18) |
| Sensor Measuring Angle | 20° approx. |
| Recycling Time | 0.3 to 7 sec. approx. with alkaline manganese batteries (National AM-1 or equivalent)<br>0.3 to 13 sec. approx. with manganese batteries (National UM-1D or equivalent)<br>0.3 to 5 sec. approx. with nickel-cadmium battery pack |
| Angle of Coverage | Normal: 45° vertical, 65° horizontal (Can cover 35 mm lens)<br>Wide: 55° vertical, 70° horizontal (Can cover 28 mm lens) |
| Number of Flashes | 250 to 3,500 approx. with alkaline manganese batteries (National AM-1 or equivalent)<br>70 to 700 approx. with manganese batteries (National UM-1D or equivalent)<br>70 to 700 approx. with National nickel-cadmium battery pack |
| Power Supply | 1.5V R20 (D size) dry battery × 8<br>nickel-cadmium battery pack |
| Colour Temperature | Ideal for colour and black & white film |
| Dimensions | Flash unit: 277 (H) × 116 (W) × 110 (D) mm<br>Power pack: 128 (H) × 238 (W) × 70 (D) mm |
| Weight | 1,200g (flash unit with bracket and clamp)<br>690g (power pack without batteries) |

### ACCESSORIES

| | |
|---|---|
| Included: | Power pack (PW-201) (without battery) (for 1.5V R20 (D size) dry battery × 8)<br>Power supply cord<br>Remote sensor (PW-10S)<br>Remote sensor synchro-cord<br>Bracket & clamp with 360° vertical swivel<br>Wide angle diffuser |
| Optional: | Nickel-cadmium battery pack and charger<br>Bracket for twin lens camera, 6 × 6 single lens reflex camera, etc.<br>Synchro-cord for manual operation or slave unit (1 meter coiled cord or 3 meter straight cord) |

MATSUSHITA ELECTRIC
MATSUSHITA ELECTRIC TRADING CO., LTD.
P. O. Box 288, Central Osaka, Japan

# I. Disassembly and reassembly

## Disassembly (body)

1. Remove the two front case securing screws (Fig. 1-37).
2. Remove the front case (Fig. 1-4).
3. Remove the two body set screws (Fig. 1-35).
4. Disassemble the upper (Fig. 1-1) and lower (Fig. 1-2) halves of the body case.

   CAUTION: The main electrolytic capacitor has a high-voltage storage capacity and must be discharged to be handled safely. To discharge the capacitor place the point of a soldering iron across the following terminals:

   (1) The main electrolytic capacitor terminals (i.e. the (+) terminal of the xenon tube and the (−) terminal of printed circuit (PC) board B).

   (2) The MD capacitor terminals (i.e. the blue and green leads and the white lead on PC board B).
5. Remove the PC board bearing the name plate base (Fig. 1-7) by sliding it out of its slots.
6. Remove the four PC board B securing screws (Fig. 1-36).
7. Remove the four PC board C securing screws (Fig. 1-36).

## Reassembly (body)

1. Replace the four PC board C securing screws.
   Replace the four PC board B securing screws.
3. Reinsert the PC board bearing the name plate base into its slots.
4. Place the 4P connector and rubber cap into their respective spaces on the right edge of the lower body half.
5. Fit together the upper and lower body case halves.
6. Set the reflector in its proper position and place the front panel on top of it.
7. Fit the wide-angle diffuser lock into the bottom of the front case and put front case into place.
8. Replace the two body set screws.
9. Replace the two front case securing screws.

## Disassembly (power pack)

1. Remove the battery compartment lid.
2. Remove the partition panel securing screws. See (Fig. 3-26, 3-27).
3. Take out the partition panel. (Fig. 3-7).
4. Remove the four side plate screws. (Fig. 3-20).
5. Remove the side plates. (Fig. 3-2)
6. Remove the three PC board securing screws. (Fig. 3-25)
   Pull out the PC board.

## Reassembly (power pack)

1. Replace the neon tube in its receptacle and attach the PC board.
2. Retighten the three PC board securing screws.
3. Replace the side plates.
4. Retighten the six side plate securing screws.
5. Reinsert the partition panel and tighten the screw.
6. Replace the battery compartment lid.

## Disassembly (remote sensor)

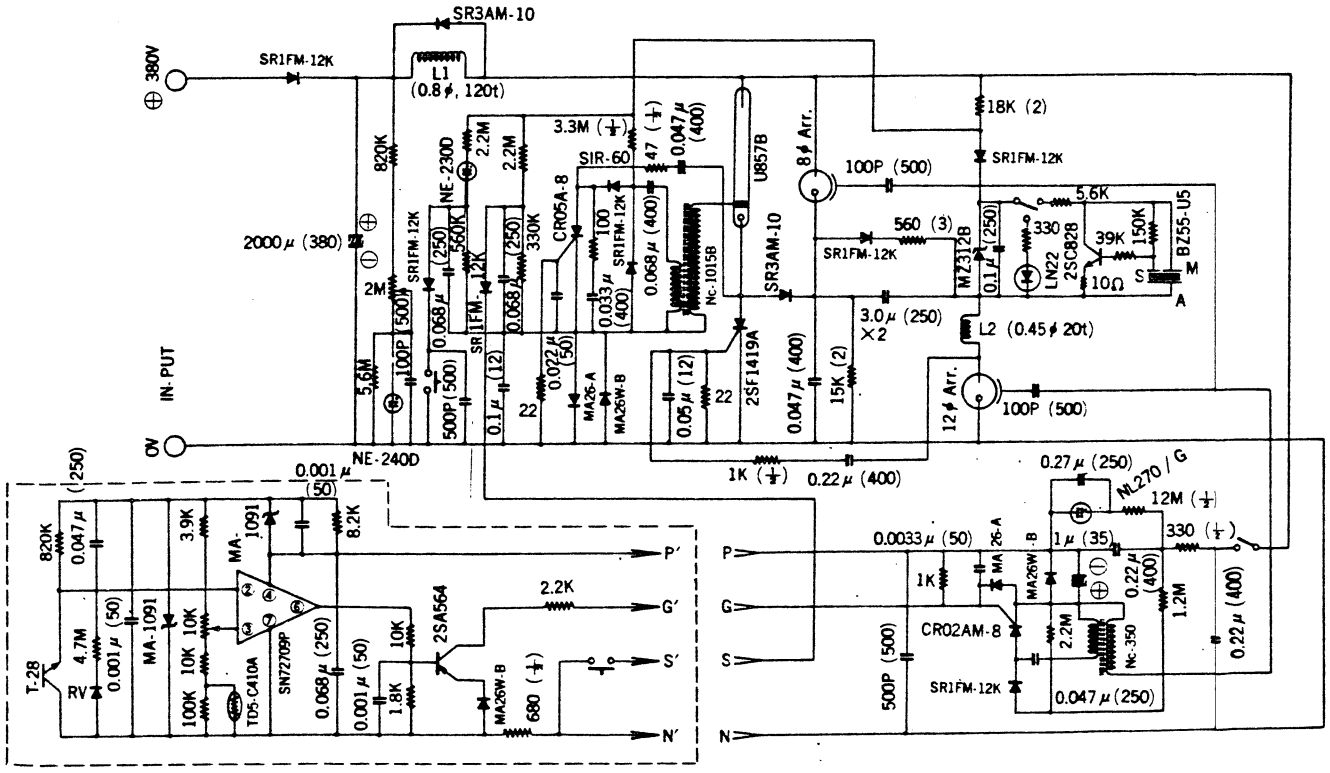
1. Remove the two sensor case securing screws (Fig. 4-15).
2. Disassemble A (Fig. 4-1) and B (Fig. 4-2) halves of the sensor case.
3. Remove the sensor case C (Fig. 4-3).
4. Disconnect the four PC board securing screws (Fig. 4-14).
5. Pull out the PC board.

Reassembly (remote sensor)

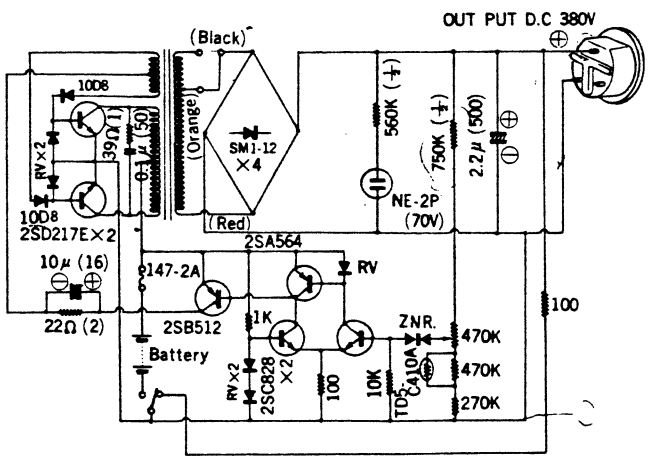
1. Reinsert the PC board and retighten the four screws.
2. Replace receptacle assembly (Fig. 4-26) and reset the sensorcase C.
3. Fit together A and B sensor case halves.
4. Retighten the two sensor case securing screws.

## 2. Electric Circuit

(Body)

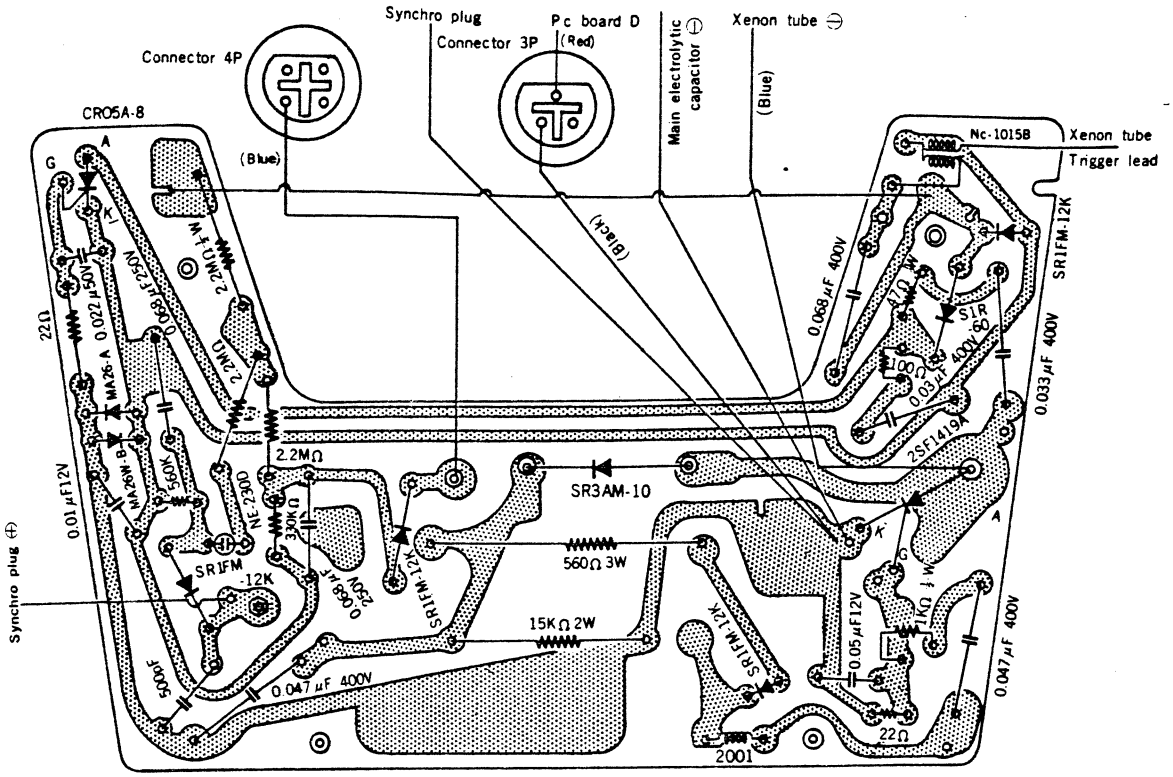


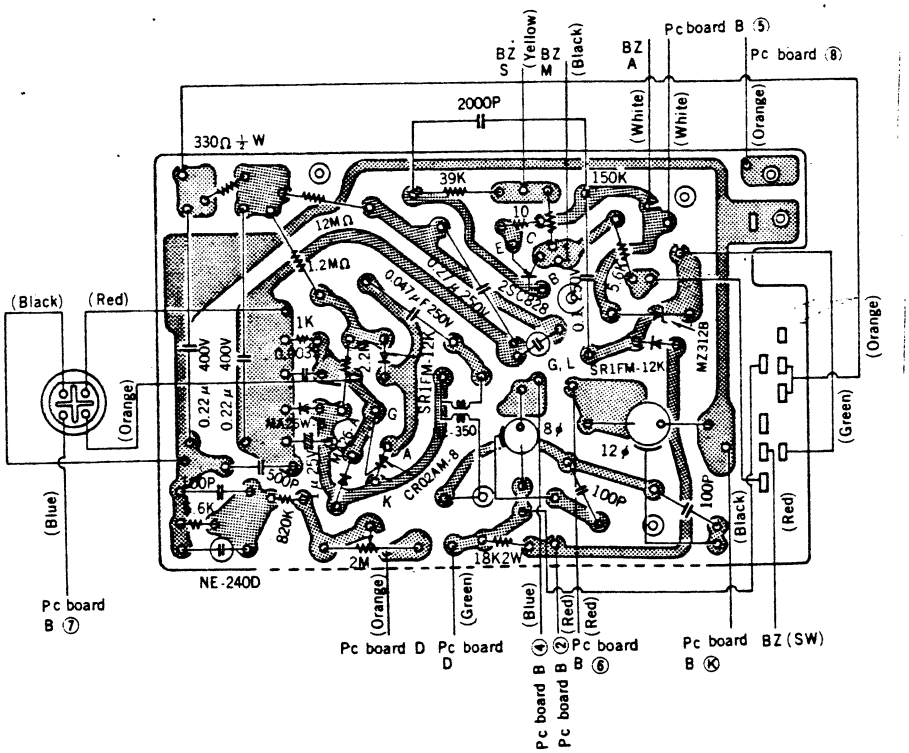

(Power pack)

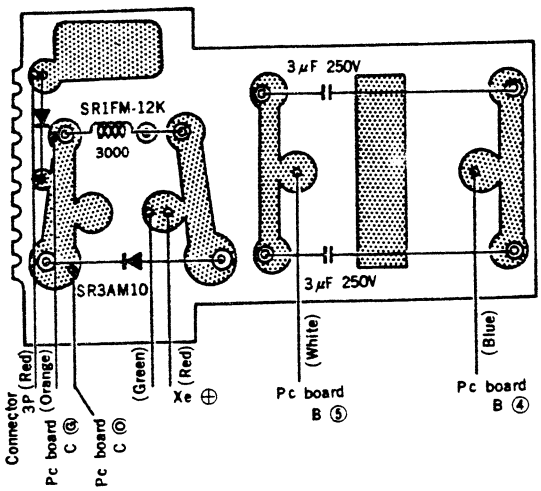


# 3. Circuit Borard Wiring View

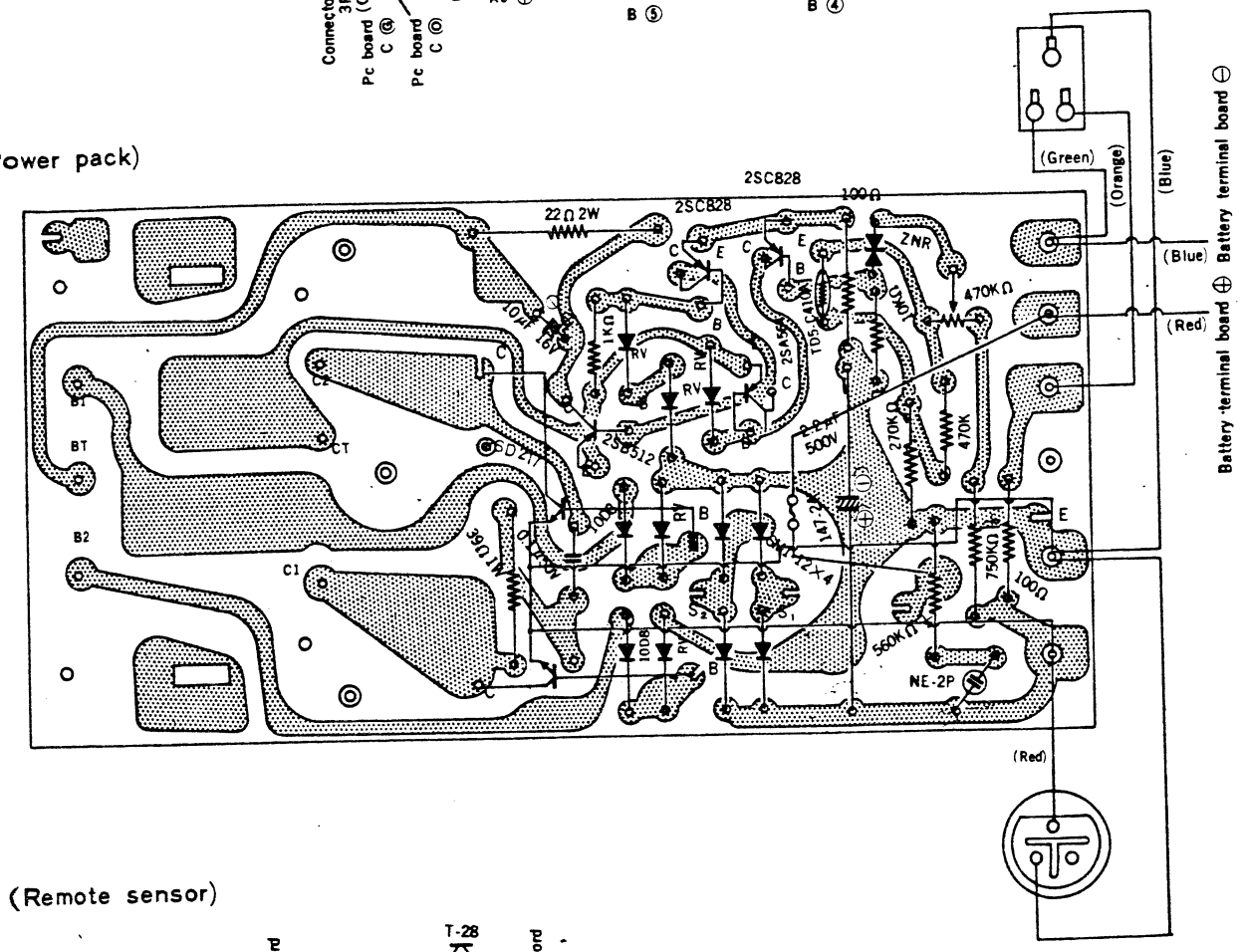
(Body)



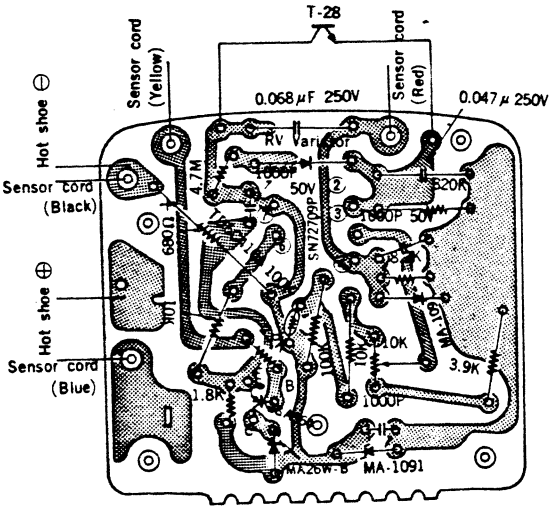



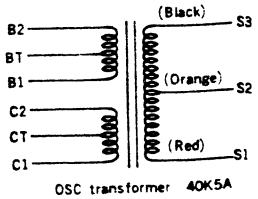



(Power pack)



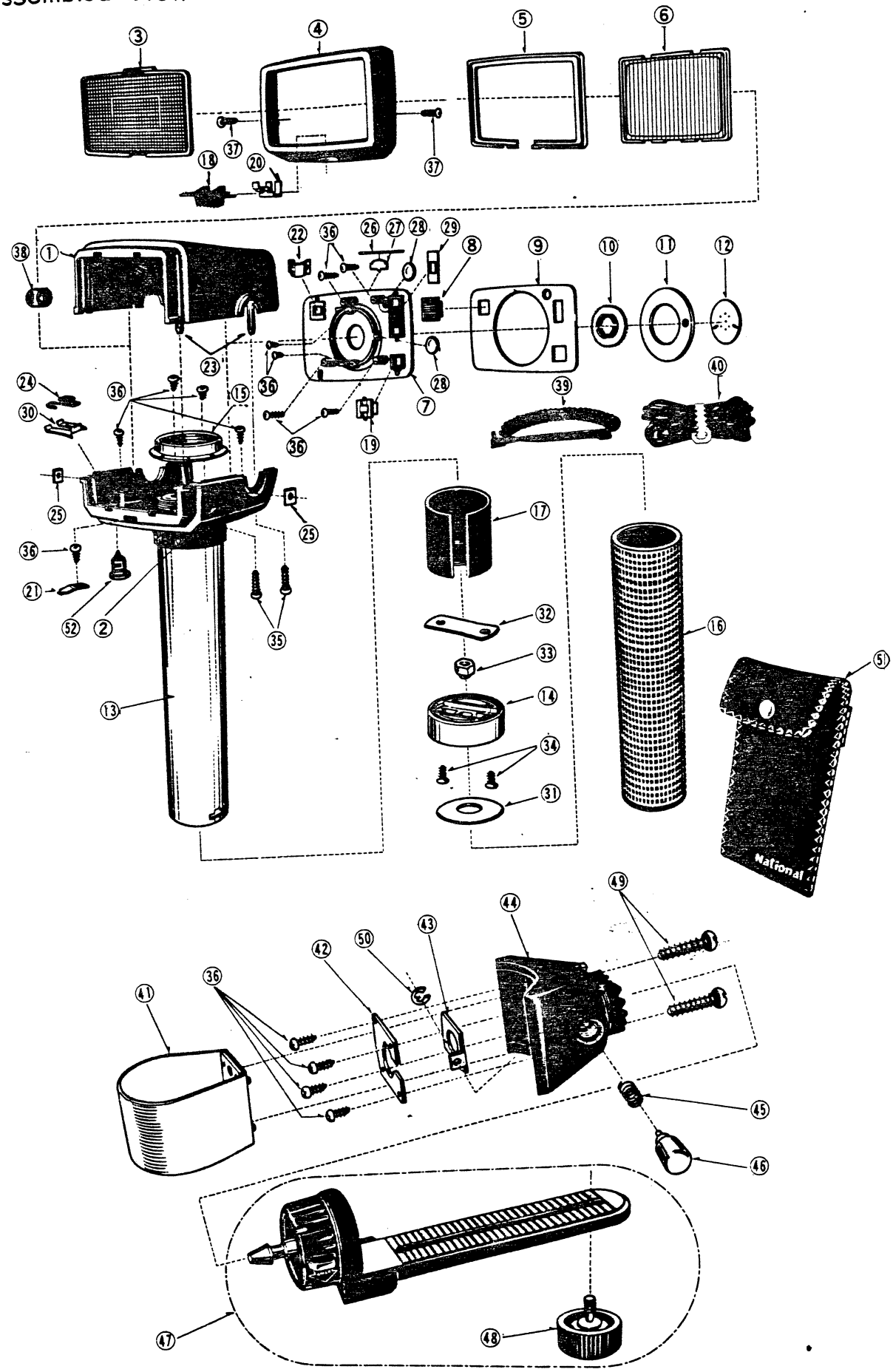

(Remote sensor)



## 4. Disassembled View

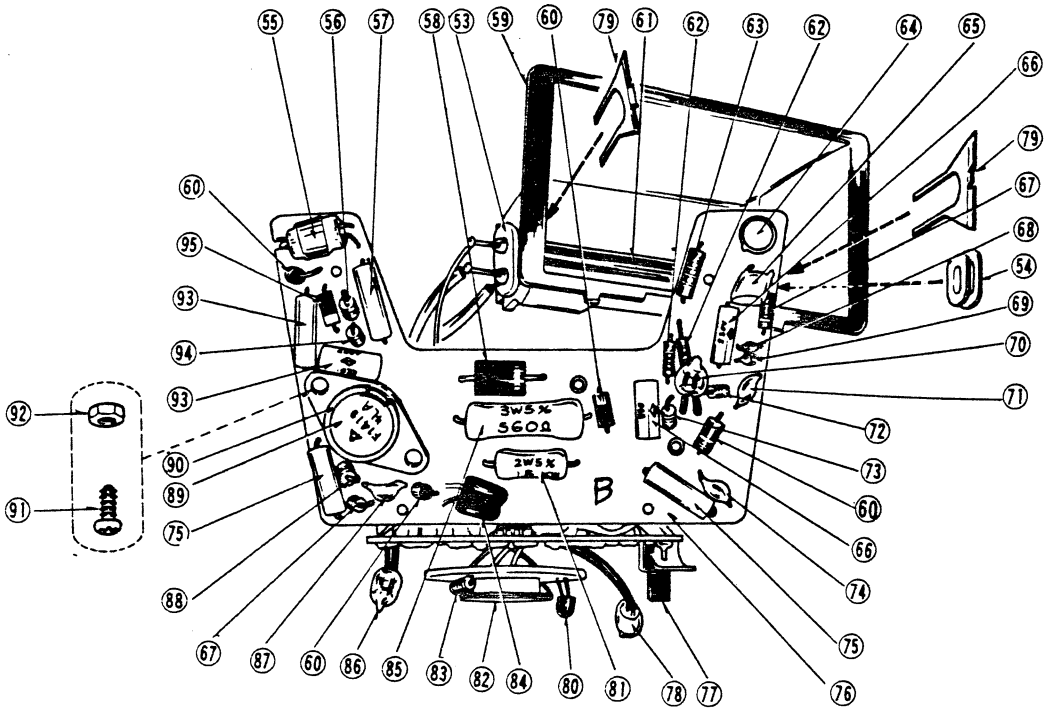
Fig. 1

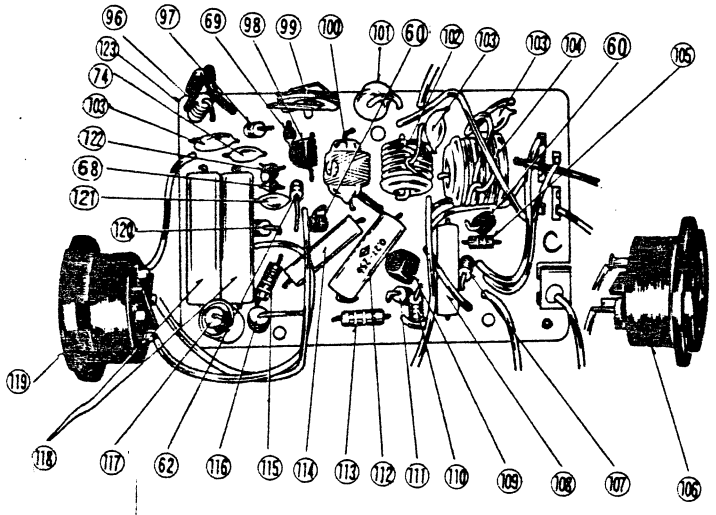


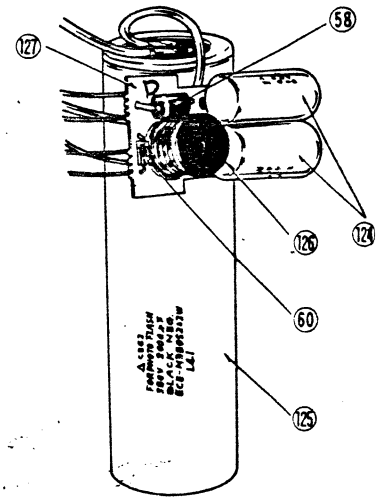
## Parts List (Fig. 1)

| Ref. No. | Part No. | Part Name & Description | Per Set (Pce) | Remarks |
|---|---|---|---|---|
| 1 | SS 000—60 | Case A, body | 1 | ○ |
| 2 | SS 000—61 | Case B, body | 1 | ○ |
| 3 | SS 005—34 | Diffuser, wide-angle | 1 | ○ |
| 4 | SS 009—26 | Case, front | 1 | ○ |
| 5 | SS 011—22 | Rubber, front case | 1 | ○ |
| 6 | SS 005—33 | Diffuser, normal | 1 | ○ |
| 7 | SS 007—35 | Base, name plate | 1 | ○ |
| 8 | SS 006—05 | Cover, neon tube | 1 | ○ |
| 9 | SS 100—94 | Plate, rear | 1 | ○ |
| 10 | SS 007—36 | Base, rotative dial | 1 | ○ |
| 11 | SS 103—55 | Plate, fixed dial | 1 | ○ |
| 12 | SS 103—56 | Plate, rotative dial | 1 | ○ |
| 13 | SS 190—08 | Grip pipe | 1 | ○ |
| 14 | SS 002—52 | Bottom cover, grip | 1 | ○ |
| 15 | SS 190—03 | Nut, pipe fixing | 1 | ○ |
| 16 | SS 024—06 | Rubber, grip | 1 | ○ |
| 17 | SS 035—07 | Holder, capacitor | 1 | ○ |
| 18 | SS 008—32 | Knob, wide-angle diffuser | 1 | ○ |
| 19 | SS 004—17 | Open flash button | 1 | ○ |
| 20 | SS 112—11 | Stopper, wide-angle diffuser | 1 | ○ |
| 21 | SS 178—07 | Spring, wide-angle diffuser | 1 | ○ |
| 22 | SS 179—02 | Holder, neon tube | 1 | ○ |
| 23 | SS 112—09 | Pole | 2 | ○ |
| 24 | SS 166—04 | Spring, synchro plug | 1 | ○ |
| 25 | SS 150—12 | Nut, front case | 2 | ○ |
| 26 | SS 178—15 | Spring, click | 1 | ○ |
| 27 | SS 178—11 | Stopper, click | 1 | ○ |
| 28 | SS 022—09 | Cover, lamp | 2 | ○ |
| 29 | SS 106—41 | Plate, AM changeover | 1 | ○ |
| 30 | SS 175—03 | Fast-on nut | 1 | ○ |
| 31 | SS 024—07 | Leather sheet | 1 | ○ |
| 32 | SS 112—22 | Plate, bottom cover | 1 | ○ |
| 33 | SS 160—04 | Nut, tripod screw | 1 | ○ |
| 34 | SG 001—23 | Screw, flat head ⊕ 3φ×12 Ni | 2 | ○ |
| 35 | SG 000—10 | Screw, pan head ⊕ 2.6φ×15 Br | 2 | |
| 36 | SG 022—11 | Screw, pan head tapping ⊕ 2φ×6 Ni | 15 | |
| 37 | SG 002—08 | Screw, oval head ⊕ 2.6φ×10 Br | 2 | |
| 38 | SS 017—20 | Rubber cap | 1 | ○ |
| 39 | SS 700—17 | Cord, synchro 1 m | 1 | ○ |
| 40 | SS 700—18 | Cord, synchro 3 m | 1 | ○ |
| 41 | SS 145—02 | Clamp band | 1 | ○ |
| 42 | SS 152—04 | Guide plate | 1 | ○ |
| 43 | SS 152—03 | Stopper | 1 | ○ |
| 44 | SS 015—02 | Clamp | 1 | ○ |
| 45 | SS 164—05 | Spring | 1 | ○ |
| 46 | SS 152—02 | Lock button | 1 | ○ |
| 47 | SS 142—51 | Bracket assembly | 1 | ○ |
| 48 | SS 160—01 | Tripod screw | 1 | ○ |
| 49 | SG 000—12 | Screw, pan head ⊕ 4φ×20 Br | 2 | |
| 50 | SG 041—05 | E-ring 1.5φ | 1 | |
| 51 | SP 200—02 | Case, wide-angle diffuser | 1 | ○ |
| 52 | SS 171—05 | Plug, synchro | 1 | ○ |

Fig. 2



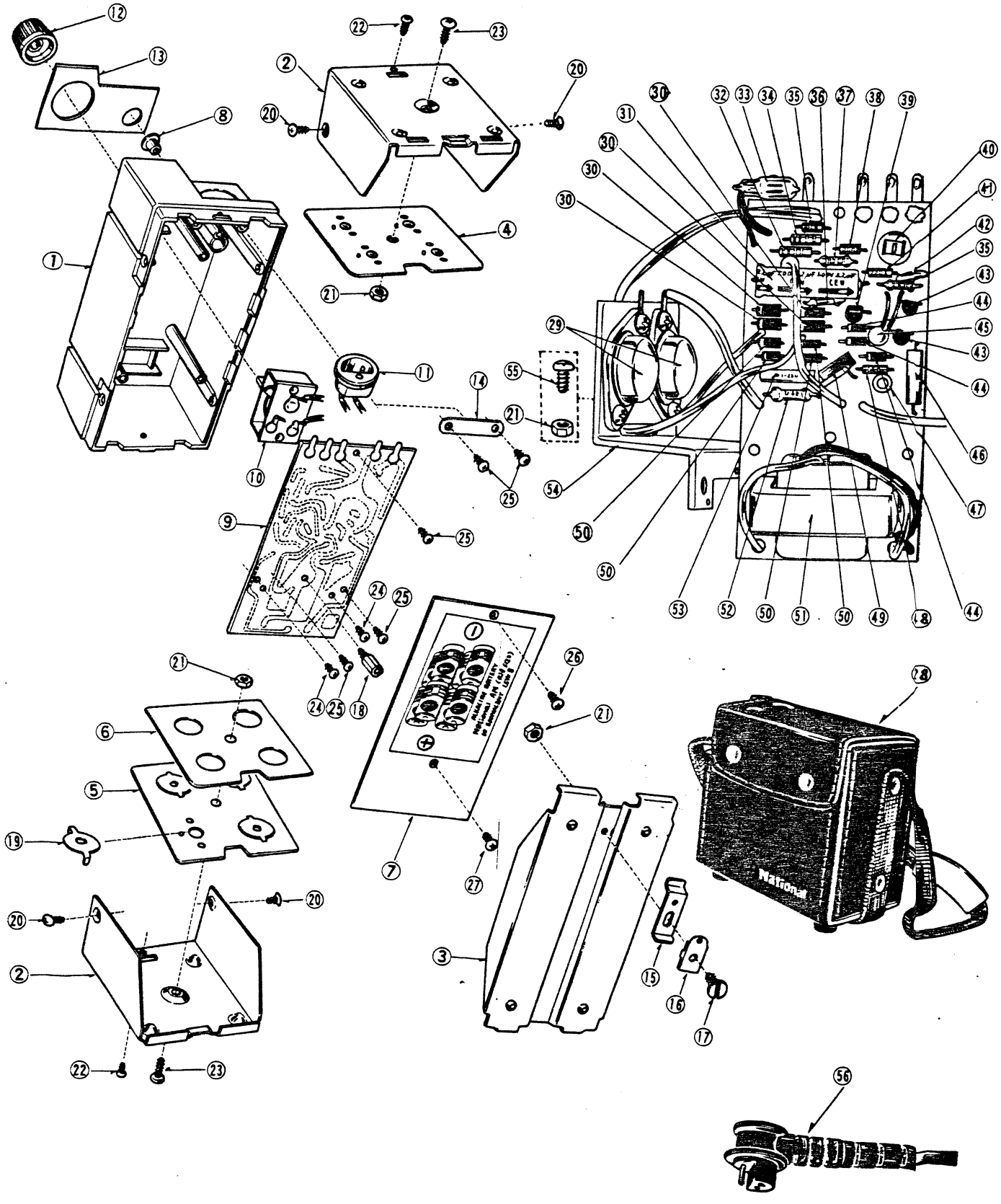




## Parts List (Fig. 2)

| Ref. No. | Part No. | Part Name & Description | Per Set (Pce) | Remarks |
|---|---|---|---|---|
| 53 | SS011—20 | Bushing A, xenon tube | 1 | ○ |
| 54 | SS011—21 | Bushing B, xenon tube | 1 | ○ |
| 55 | SS508—24 | Coil, trigger Nc-1015 B | 1 | ○ |
| 56 | SC009—74 | Resistor, solid 47Ω ½ W | 1 | |
| 57 | SC001—19 | Capacitor, MD 0.068μF 400wv | 1 | |
| 58 | SC005—37 | Diode, silicon SR3AM-10 | 2 | ○ |
| 59 | SS003—26 | Reflector | 1 | ○ |
| 60 | SC005—07 | Diode, silicon SR1FM-12K | 7 | |
| 61 | SS500—21 | Tube, xenon U-857B | 1 | ○ |
| 62 | SC007—02 | Resistor, solid 2.2MΩ ¼W | 3 | |
| 63 | SC007—30 | Resistor, solid 3.3MΩ ½W | 1 | |
| 64 | SC023—13 | SCR, CR05A-8 | 1 | ○ |
| 65 | SC001—23 | Capacitor, mylar 0.022μF 50WV | 1 | |
| 66 | SC001—11 | Capacitor, MD 0.068μF 250wv | 2 | |
| 67 | SC007—45 | Resistor, solid 22Ω ¼W | 2 | |

| Ref. No. | Part No. | Part Name & Description | Per Set (Sce) | Remarks |
|---|---|---|---|---|
| 68 | SC027—04 | Varistor, MA26-A | 2 | ○ |
| 69 | SC027—05 | Varistor, MA26W-B | 2 | ○ |
| 70 | SS502—16 | Tube, neon NE-230D | 1 | |
| 71 | SC004—04 | Capacitor, semiconductive 0.1μF 12WV | 1 | |
| 72 | SC007—35 | Resistor, solid 560KΩ ¼W | 1 | |
| 73 | SC007—09 | Resistor, solid 330KΩ ¼W | 1 | |
| 74 | SC002—03 | Capacitor, ceramic 500pF 500wv | 2 | |
| 75 | SC001—03 | Capacitor, MD 0.047μF 400wv | 2 | |
| 76 | SS401—04 | Board B, printed circuit | 1 | ○ |
| 77 | SC300—22 | Switch, slide 8P | 1 | ○ |
| 78 | SS502—20 | Lamp, green NL-270 / G | 1 | ○ |
| 79 | SS107—12 | Side plate, reflector | 2 | ○ |
| 80 | SC025—01 | LED, LN-22 | 1 | ○ |
| 81 | SC008—88 | Resistor, metal oxide 15KΩ 2W | 1 | |
| 82 | SS518—02 | Audible signal, BZ55-U5 | 1 | ○ |
| 83 | SC009—08 | Resistor, solid 330Ω ⅛W | 1 | ○ |
| 84 | SC021—02 | Inductor, 2001 | 1 | |
| 85 | SC008—87 | Resistor, metal oxide 560Ω 3W | 1 | |
| 86 | SS502—02 | Tube, neon NE-240D | 1 | |
| 87 | SC004—01 | Capacitor, semiconductive 0.05μF 12wv | 1 | |
| 88 | SC009—76 | Resistor, solid 1KΩ ½W | 1 | ○ |
| 89 | SC023—17 | SCR, 2SF1419 Ⓐ | 1 | ○ |
| 90 | SS113—20 | Plate, radiating SCR | 1 | ○ |
| 91 | SG000—14 | Screw, pan head ⊕ 3φ×6 Ni | 1 | |
| 92 | SG040—05 | Nut, 3φ | 1 | |
| 93 | SC001—40 | Capacitor, MD 0.033μF 400wv | 2 | ○ |
| 94 | SC007—04 | Resistor, solid 100Ω ¼W | 1 | |
| 95 | SC005—39 | Diode, silicon S1R-60 | 1 | |
| 96 | SC009—51 | Resistor, solid 5.6MΩ ¼W | 1 | |
| 97 | SC007—40 | Resistor, solid 820KΩ ¼W | 1 | |
| 98 | SC023—04 | SCR, CR02AM-8 | 1 | |
| 99 | SC015—16 | Resistor, variable 2MΩ | 1 | ○ |
| 100 | SS508—23 | Coil, trigger Nc-350 | 1 | |
| 101 | SC008—89 | Resistor, metal oxide 18KΩ 2W | 1 | |
| 102 | SS513—01 | Arrestor, 8φ | 1 | |
| 103 | SC002—01 | Capacitor, ceramic 100pF 500wv | 3 | |
| 104 | SS513—02 | Arrestor, 12φ | 1 | |
| 105 | SC006—07 | Diode, zener MZ312B | 1 | ○ |
| 106 | SS012—08 | Connector, 3P | 1 | ○ |
| 107 | SC009—71 | Resistor, solid 5.6KΩ ¼W | 1 | ○ |
| 108 | SC001—12 | Capacitor, MD 0.1μF 250wv | 1 | |
| 109 | SC003—18 | Transistor, silicon 2SC828 | 1 | |
| 110 | SC009—73 | Resistor, solid 15KΩ ¼W | 1 | ○ |
| 111 | SC009—70 | Resistor, solid 10Ω ¼W | 1 | ○ |
| 112 | SC001—22 | Capacitor, MD 0.27μF 250wv | 1 | |
| 113 | SC009—72 | Resistor, solid 39KΩ ¼W | 1 | ○ |
| 114 | SC001—08 | Capacitor, 0.047μF 250wv | 1 | |
| 115 | SC007—03 | Resistor, solid 1.2MΩ ¼W | 1 | |
| 116 | SC009—82 | Resistor, solid 12MΩ ½W | 1 | ○ |
| 117 | SC009—75 | Resistor, solid 330Ω ½W | 1 | ○ |
| 118 | SC001—25 | Capacitor, MD 0.22μF 400wv | 2 | ○ |
| 119 | SS012—09 | Connector, 4P | 1 | ○ |
| 120 | SC007—07 | Resistor, solid. 1KΩ ¼W | 1 | |
| 121 | SC001—39 | Capacitor, mylar 0.0033μF 50wv | 1 | |
| 122 | SC020—07 | Capacitor, tantalum 1μF 35wv | 1 | ○ |
| 123 | SS401—05 | Board C, printed circuit | 1 | ○ |
| 124 | SC001—31 | Capacitor, MD 3.0μF 250wv | 2 | ○ |
| 125 | SS504—50 | Capacitor, main electrolytic 2000μF 380wv | 1 | ○ |
| 126 | SC021—07 | Inductor 3000 | 1 | |
| 127 | SS401—06 | Board D, printed circuit | 1 | ○ |
| | | | | |

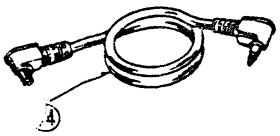
Fig. 3



# Parts List (Fig. 3)

| Ref. No. | Part No. | Part Name & Description | Per Set (Pce) | Remarks |
|---|---|---|---|---|
| 1 | SS 002—53 | Case, power pack | 1 | ○ |
| 2 | SS 220—01 | Plate, side | 2 | ○ |
| 3 | SS 001—39 | Lid, battery compartment | 1 | ○ |
| 4 | SS 404—11 | Board ⊖ assembly, battery terminal | 1 | ○ |
| 5 | SS 404—08 | Board, battery terminal | 1 | ○ |
| 6 | SS 404—09 | Board C | 1 | ○ |
| 7 | SS 404—10 | Board D | 1 | ○ |
| 8 | SS 006—11 | Cover, charging indication | 1 | ○ |
| 9 | SS 405—08 | Board, printed circuit | 1 | ○ |
| 10 | SC 304—02 | Switch, rotary | 1 | ○ |
| 11 | SS 012—08 | Connector, 3P | 1 | ○ |
| 12 | SS 008—46 | Knob, switch | 1 | ○ |
| 13 | SS 106—42 | Plate, switch | 1 | ○ |
| 14 | SS 112—24 | Connector retainer | 1 | ○ |
| 15 | SS 146—03 | Lever | 1 | ○ |
| 16 | SS 167—02 | Slide, lever | 1 | ○ |
| 17 | SG 034—07 | Screw, lever | 1 | ○ |
| 18 | SS 112—23 | Pole | 1 | ○ |
| 19 | SS 109—60 | Terminal ⊕, battery | 4 | ○ |
| 20 | SG 025—06 | Screw, flat head tapping ⊕ 2.6φ×6 Br | 4 | ○ |
| 21 | SG 040—05 | Nut, 3φ | 7 | |
| 22 | SG 023—10 | Screw, pan head tapping ⊕ 2φ×6 Br | 2 | ○ |
| 23 | SG 006—01 | Screw, bind ⊕ 3φ×8 Br | 2 | ○ |
| 24 | SG 000—03 | Screw, pan head ⊕ 2φ×6 Ni | 2 | |
| 25 | SG 023—09 | Screw, pan head tapping ⊕ 2.6φ×8 Ni | 5 | ○ |
| 26 | SG 025—07 | Screw, flat head tapping ⊕ 2.6φ×8 Ni | 1 | ○ |
| 27 | SG 001—08 | Screw, flat head ⊕ 2φ×4 Ni | 1 | |
| 28 | SP 200—01 | Case, carrying | 1 | ○ |
| 29 | SC 003—31 | Transistor, silicon 2SD217 | 2 | ○ |
| 30 | SC 005—38 | Diode, silicon SM1-12 | 4 | |
| 31 | SC 000—23 | Capacitor, electrolytic 2.2μF 500wv | 1 | ○ |
| 32 | SC 009—78 | Resistor, solid 560KΩ ½W | 1 | ○ |
| 33 | SS 502—21 | Tube, neon NE-2P | 1 | ○ |
| 34 | SC 009—77 | Resistor, solid 750KΩ ¼W | 1 | ○ |
| 35 | SC 007—04 | Resistor, solid 100Ω ¼W | 2 | ○ |
| 36 | SC 014—01 | Fuse, thermal 147-2A | 1 | ○ |
| 37 | SC 007—91 | Resistor, carbon 270KΩ ¼W | 1 | |
| 38 | SC 007—19 | Resistor, solid 470KΩ ¼W | 1 | |
| 39 | SC 003—14 | Transistor, silicon 2SA564 | 1 | |
| 40 | SC 015—17 | Resistor, variable 470KΩ | 1 | ○ |
| 41 | SC 007—13 | Resistor, solid 10KΩ ¼W | 1 | |
| 42 | SS 510—01 | ZNR | 1 | |
| 43 | SC 003—18 | Transistor, silicon 2SC828 | 2 | |
| 44 | SC 027—01 | Varistor, RV | 5 | |
| 45 | SC 010—05 | Thermistor, TD5-C410A | 1 | ○ |
| 46 | SC 008—93 | Resistor, metal oxide 22Ω 2W | 1 | ○ |
| 47 | SC 000—22 | Capacitor, electrolytic 10μF 16wv | 1 | |
| 48 | SC 007—07 | Resistor, solid 1KΩ ¼W | 1 | |
| 49 | SC 003—29 | Transistor, silicon 2SB512 | 1 | ○ |
| 50 | SC 005—05 | Diode, silicon 10D8 | 2 | |
| 51 | SS 506—40 | Trasformer, OSC 40K5A | 1 | ○ |
| 52 | SC 008—94 | Resistor, metal oxide 39Ω 1W | 1 | ○ |
| 53 | SC 001—41 | Capacitor, mylar 0.1μF 50wv | 1 | ○ |
| 54 | SS 113—19 | Plate, radiating, transistor | 1 | ○ |
| 55 | SG 000—22 | Screw, pan head ⊕ 3φ×12 Ni | 4 | |
| 56 | SS 701—36 | Cord, power | 1 | ○ |

Fig. 4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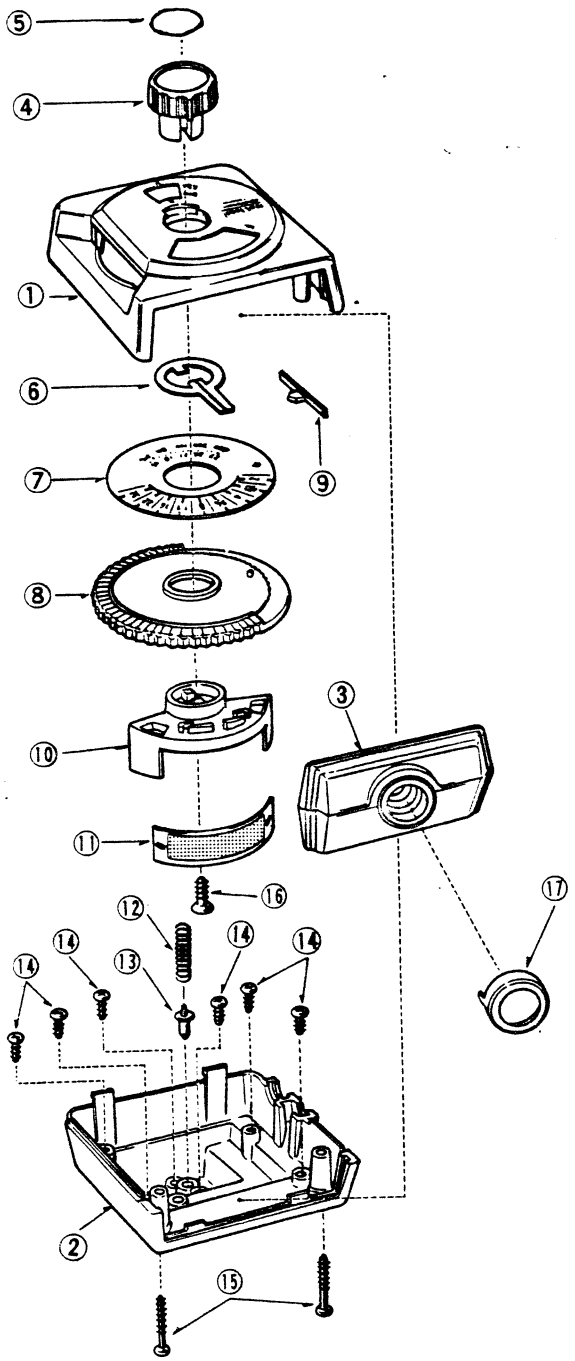
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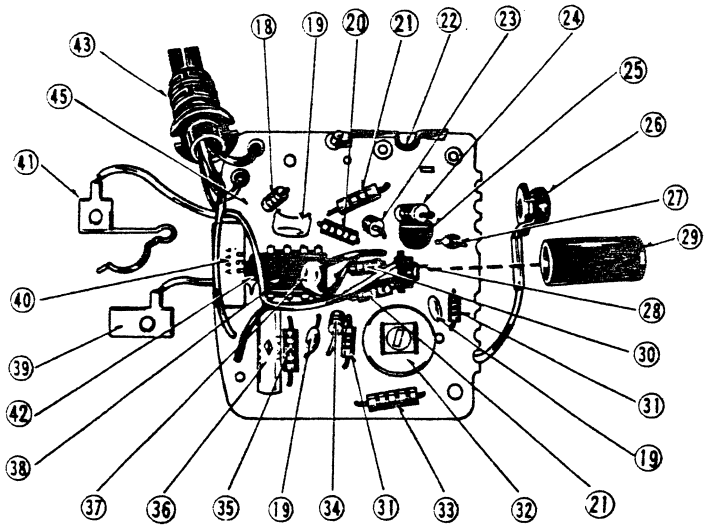
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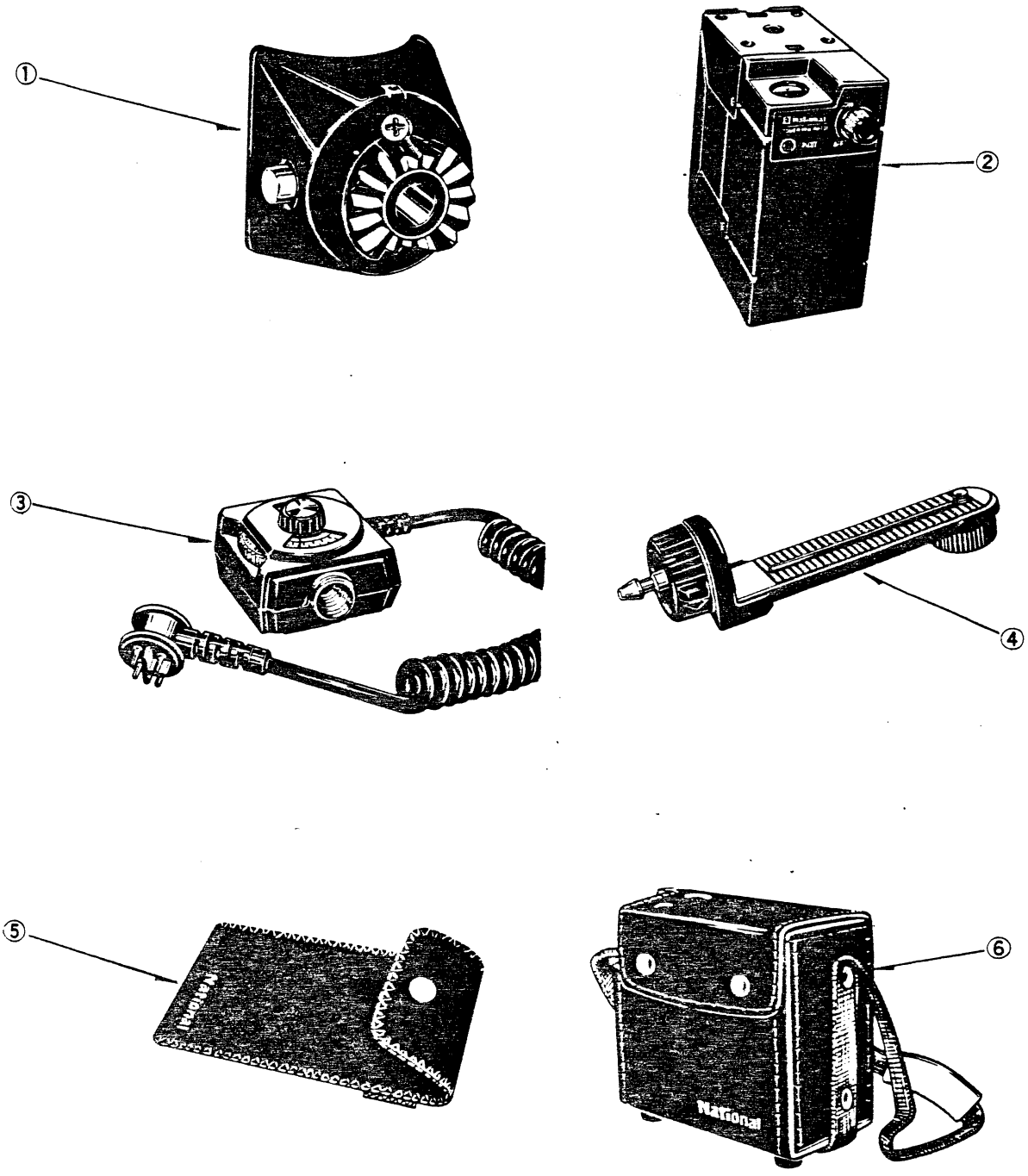
# Parts List (Fig. 4)

| Ref. No. | Part No. | Part Name & Description | Per Set (Pce) | Remarks |
|---|---|---|---|---|
| 1 | SS 090—05 | Case A, sensor | 1 | ○ |
| 2 | SS 090—06 | Case B, sensor | 1 | ○ |
| 3 | SS 090—09 | Case C, sensor | 1 | ○ |
| 4 | SS 008—47 | Knob, auto changeover | 1 | ○ |
| 5 | SS 106—43 | Plate, dial knob | 1 | ○ |
| 6 | SS 106—44 | Plate, auto changeover | 1 | ○ |
| 7 | SS 103—58 | Plate, rotative dial | 1 | ○ |
| 8 | SS 007—37 | Base, rotative dial | 1 | ○ |
| 9 | SS 178—06 | Stopper, click | 1 | ○ |
| 10 | SS 020—19 | Cover, sensor | 1 | ○ |
| 11 | SS 025—29 | Filter, mesh | 1 | ○ |
| 12 | SS 119—02 | Spring | 1 | ○ |
| 13 | SS 117—04 | Contact, shoe | 7 | |
| 14 | SG 023—02 | Screw, pan head tapping ⊕ 2φ×4 Ni | 2 | |
| 15 | SG 022—08 | Screw, pan head tapping ⊕ 2φ×15 Br | 1 | |
| 16 | SG 024—08 | Screw, flat head tapping ⊕ 2.6φ×10 Ni | 1 | ○ |
| 17 | SS 225—01 | Ring | 1 | ○ |
| 18 | SC 009—80 | Resistor, solid 4.7MΩ ¼W | 3 | |
| 19 | SC 002—11 | Capacitor, ceramic 1000pF 50wv | 1 | ○ |
| 20 | SC 009—81 | Resistor, solid 680Ω ½W | 2 | |
| 21 | SC 007—10 | Resistor, solid 10KΩ ¼W | 1 | ○ |
| 22 | SS 110—26 | Contact, jack-changeover | 1 | |
| 23 | SC 007—01 | Resistor, solid 2.2KΩ ¼W | 1 | ○ |
| 24 | SC 009—79 | Resistor, solid 1.8KΩ ¼W | 1 | |
| 25 | SC 003—13 | Transistor, silicon 2SA564 | 1 | ○ |
| 26 | SS 203—07 | Receptacle assembly | 1 | ○ |
| 27 | SC 027—05 | Varistor, MA26W-B | 1 | ○ |
| 28 | SS 034—04 | Sensor hood | 1 | |
| 29 | SS 512—02 | Photo-transistor T-28 | 1 | |
| 30 | SC 007—25 | Resistor, solid 100KΩ ¼W | 2 | ○ |
| 31 | SC 006—08 | Diode, zener MA-1091 | 1 | ○ |
| 32 | SC 015—18 | Resistor, variable 10KΩ | 1 | |
| 33 | SC 007—15 | Resistor, solid 3.9KΩ ¼W | 1 | |
| 34 | SC 009—66 | Resistor, solid 8.2KΩ ¼W | 1 | |
| 35 | SC 007—40 | Resistor, solid 820KΩ ¼W | 1 | |
| 36 | SC 001—08 | Capacitor, MD 0.047μF 250wv | 1 | ○ |
| 37 | SC 010—05 | Thermistor, TD5-C410A | 1 | ○ |
| 38 | SS 514—02 | I C, SN72709P | 1 | ○ |
| 39 | SS 163—12 | Shoe contact ⊕ | 1 | |
| 40 | SC 001—11 | Capacitor, MD 0.068μF 250wv | 1 | ○ |
| 41 | SS 163—13 | Shoe contact ⊖ | 1 | |
| 42 | SC 027—01 | Varistor, RV | 1 | ○ |
| 43 | SS 703—03 | Cord, sensor | 1 | |
| 44 | SS 700—13 | Cord, synchro | 1 | ○ |
| 45 | SS 407—14 | Board, printed circuit | | |

Fig. 5




## Parts List (Fig. 5)

| Ref. No. | Part No. | Part Name & Description | Per Set (Pce) | Remarks |
|---|---|---|---|---|
| 1 | SA101—01 | Clamp | 1 | ○ |
| 2 | SA002—01 | Power pack | 1 | ○ |
| 3 | SA004—02 | Remote sensor | 1 | ○ |
| 4 | SS142—51 | Bracket assembly | 1 | ○ |
| 5 | SP200—02 | Case, wide-angle diffuser | 1 | ○ |
| 6 | SP200—01 | Case, carrying | 1 | ○ |

Note: The assembly parts of Fig. 5 will be available to supply for one year only after discontinuation of the flash unit PE-5650.

# 5. Troubleshooting

I Difficulty in manual (M) operation

YES: works NO: does not work

| Trouble | | | Check-Points |
|---|---|---|---|
| Neon lamp | Xenon tube | Capacitor terminal voltage reading | |
| NO | NO | Voltage does not rise(0V) | Power pack [battery, switch, thermal fuse, transistor (2SD217),(2SB512), (2SC828) and OSC transformer]. Charge circuit (main electrolytic capacitor). |
| NO | NO | Standard level (approx. 380V) | Neon lamp, variable resistor and flash circuit [xenon tube, trigger coil, trigger capacitor, silicon diode and SCR (CR05A-8)]. Remote sensor (synchro-cord). |
| YES | NO | Standard level (approx. 380V) | Flash circuit [xenon tube, trigger coil, trigger capacitor, silicon diode and SCR (CR05A-8)]. Remote sensor (synchro-cord). |
| NO | YES | Standard level (approx. 380V) | Neon lamp and variable resistor. |
| YES | Slight flash | Standard level (approx. 380V) | Auto circuit [SCR (2SF1419 Ⓐ) and arrestor]. |

II Difficulty in automatic operation

(First confirm normal manual operation.)

1. If the automatic device does not work at all(the flash light volume is the same as that of manual operation), check the following points.

A. Attach auto sensor to the flash unit and shortcircuit points A and K of SCR to check the arrestor flash.

(a) If the arrestor flashes, check the phototransistor, zener diode and IC.

(b) If the arrestor does not flash, check all parts except those listed in (a) above.

B. Flash after connecting a resistor (approx. 1KΩ) to the terminals of phototransistor. If the xenon tube flashes very slightly, check the phototransistor and zener diode.

2. If automatic device works but not normally, check the following points.

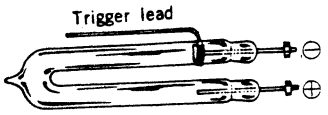
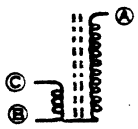
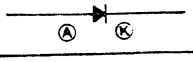
| Trouble | Check points |
|---|---|
| Flash light volume remains constant every time.<br>(It does not change with flash-subject distance.) | Auto circuit [tantalum capacitor and varistor (MA26W-B)].<br>Remoto sensor [phototransistor and MD capacitor (0.047μF 250WV)]. |
| F-stop value is in correct (under or over-exposure) | Remote sensor [variable resistor and phototransistor]. |
| Fluctuation of F-stop value | Auto circuit [xenon tube, varistor (MA26W-B), SCR (CR02AM-8)].<br>Remote sensor [phototransistor, MD capacitor (0.047μF) and variable resistor (10KΩ)]. |

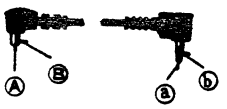
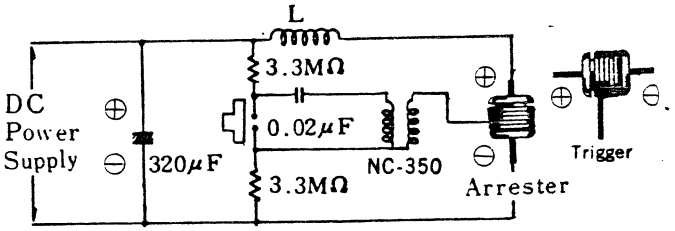
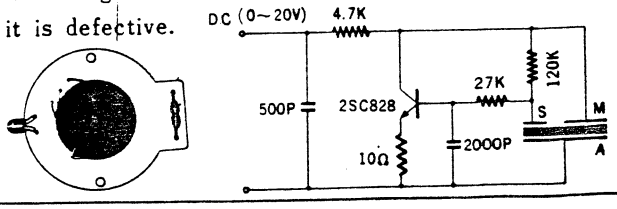
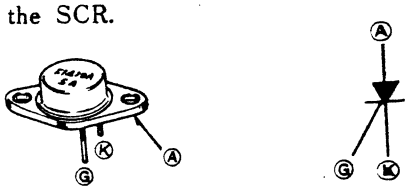
Ⅲ Other trouble

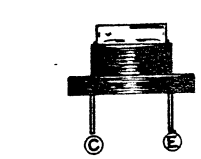
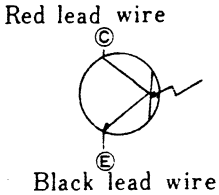
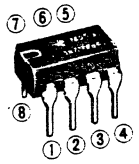
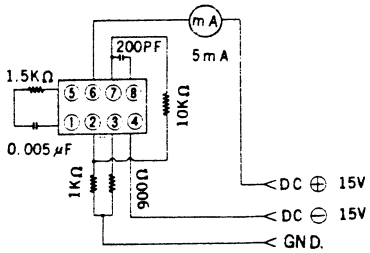
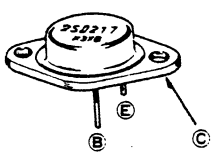
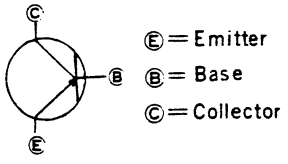
| Trouble | Check points |
|---|---|
| Auto set lamp doesn't flicker | Switch, MD capacitor (0.27μF 250WV), sensor cord, green lamp. |
| Audible signal doesn't sound | Switch, zener diode (MZ312B).<br>Transistor (2SC828) audible signal. |
| Auto lamp doesn't light | Switch, zener diode (MZ312B).<br>LED. |

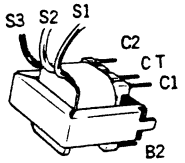
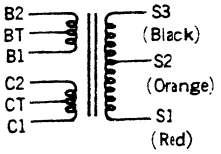
## 6. Part check procedure

| Check Points | Part | Check procedure |
|---|---|---|
| Charge circuit | Main capacitor | Connect the (+) tester probe to the main capacitor terminal A and the (−) tester probe to the main electrolytic capacitor terminal B.<br>If the tester needle swings vigorously toward zero for a moment and then gradually returns, the capacitor is normal.<br>**Caution:**<br>Before checking, discharge the capacitor by using a soldering iron as described in "Disassembly and Reassembly." |

| Check Points | Part | Check Procedure |
|---|---|---|
| Flash circuit | Xenon tube |  <br>Check visually for the following:<br>• a cracked tube<br>• a broken lead wire<br>• a disconnected trigger band<br>If any of the above are found, the tube is faulty.<br>Flash voltage test: If the tube flashes at a capacitor voltage of about DC 220 volts, or less, it is normal. |
| | Trigger coil | Check for continuity with tester between Ⓐ — Ⓑ If the tester needle does not Ⓐ — Ⓒ deflect, the trigger coil is Ⓑ — Ⓒ abnormal.<br>  <br> |
| | Silicon diode | Check with tester set to xl range as follows:<br>Tester needle deflects if the (+) and (−) test probes are connected to Ⓚ and Ⓐ, respectively.<br>It should not deflect if the (+) and (−) test probes are reversed and the tester needle deflects, there is fault in the silicon diode.<br> <br>  |
| | SCR (CR05A-8) | Using a tester set at xl range, set the (+) contact to Ⓚ and the (−) to Ⓖ.<br>If the needle does not deflect, there is fault in the SCR.<br> <br> |

| Check Points | Part | Check Procedure |
|---|---|---|
| Flash circuit | Synchro-cord | Check for continuity with tester.<br>Synchro-cord terminals ⓐ and Ⓐ, and synchro-cord terminals ⓑ and Ⓑ.<br>If the tester needle does not deflect, the synchro-cord has a fault.<br>Check for synchro-cord terminals Ⓐ and Ⓑ.<br>If the tester needle deflects, the synchro-cord has a fault.<br>  |
| Neon light circuit | Neon lamp | If the neon lamp lights up at between DC 230 volts to 250 volts, it is normal.<br> |
| Auto circuit | Arrester | Make a visual check the following points:<br>• a cracked glass tube<br>• a disconnected trigger band<br>If either of the above are found the arrestor is faulty.<br>  |
| | Audible signal | Connect the audible signal to the circuit shown below and gradually increase voltage from 0 to 20V DC.<br>If the signal does not sound within this voltage range it is defective.<br>  |
| | SCR<br>(2SF1419 Ⓐ) | Using a tester set at xl range, set the (+) contact to Ⓚ and the (−) to Ⓖ.<br>If the tester needle does not deflect, there is a fault in the SCR.<br>  |

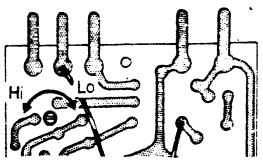
<table>
<tr><th>Check points</th><th>Part</th><th>Check procedure</th></tr>
<tr><td rowspan="2">Remote sensor</td><td>Phototransistor</td><td>Check with a tester by setting the (+) contact to Ⓒ and the (−) to Ⓔ.<br>If the needle does not deflect when the photo-transistor is exposed to light and remains stationary when the light is cut off, there is a fault in the phototransistor.<br>  <br>Red lead wire Black lead wire<br>  <br>Red lead wire<br>Black lead wire</td></tr>
<tr><td>IC</td><td>Connect the IC to the circuit shown below and apply 15 V DC. IC current should read below 5 mA; if it exceeds this value the IC is defective.<br>  <br>  </td></tr>
<tr><td>Power pack</td><td>Transistor (2SD217)</td><td>Check with a tester using the ×100 range as follows:<br><table><tr><th>Check points</th><th colspan="2">Probe check points and needle deflection</th></tr><tr><td>Ⓑ<br>Ⓒ</td><td>(+) Needle does not<br>(−) deflect.</td><td>(−)<br>(+)</td><td>Needle deflects.</td></tr><tr><td>Ⓑ<br>Ⓔ</td><td>(+) Needle does not<br>(−) deflect.</td><td>(−)<br>(+)</td><td>Needle deflects.</td></tr><tr><td>Ⓒ<br>Ⓔ</td><td>(+) Needle does not<br>(−) deflect.</td><td>(−) Needle does not<br>(+) deflect.</td><td></td></tr></table>If the needle action is revirsly, the transistor has a fault.<br>  <br>  </td></tr>
<tr><td>Thermal fuse</td><td>Check for continuity with tester.</td></tr>
</table>

| Check points | Part | Check procedure |
|---|---|---|
| Power pack | Oscillating transformer | Check with tester for continuity at the following points:<br>Between (BT)—(B1 or B2) } Tester needle deflects.<br>(CT)—(C1 or C2) } (resistance value 0)<br>(S1)—(S2)<br>(S1)—(S3) approx. 220Ω<br>The transformer is normal if the above reactions occur.<br>If not, the transformer has a trouble.<br>  <br>  |

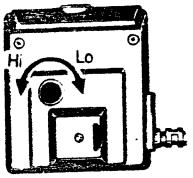
## 7. Calibrating parts

1. Body: Adjust neon lamp voltage to 310-330V by turning the volume knob.
2. Power pack: Connect the power cord and turn the power switch on.
   As illustrated, connect the tester probe and turn the volume knob to 380±5V. (Fig. 6)
3. Remote sensor: Following the procedure of 8-3 below, adjust the remote sensor with the volume knob to arrive at the designated F-stop value. (Fig. 7)

(Fig. 6)




(Fig. 7)




## 8. Checking after repairs

Check the following points after attaching the power pack and remote sensor to the body.
Use a new battery.

1. Power pack: a. Switch the monitoring pilot lamp on and off to confirm that it operates properly.
   b. With the switch on, confirm that the audible signal sounds every few seconds.
2. Body:
   a. Confirm that the pilot lamp lights approx. 7 seconds after the AM switch is set at MANUAL and the power pack turned on.
   b. Immediately after the pilot lamp lights, confirm that depressing the open flash button produces a flash.
   c. When setting the AM switch to AUTO (sound or lamp), confirm that the pilot lamp flickers.
   d. When setting the AM switch to AUTO (sound) and flashing, listen for the audible signal.
   e. When setting the AM switch to AUTO (lamp) be sure that the auto lamp flickers.
   NOTE: for d. and e. be sure that the sensing window is in the proper position.

3. Determining the auto f-value:
   Confirm that the f value is in the proper range by flashing every 30 seconds at a 2 meter distance.

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